Name: _____

at1121exam_practice: Radicals and Squares (v601)

Question 1

Simplify the radical expressions.

$$\sqrt{20} \qquad\qquad \sqrt{98} \qquad\qquad \sqrt{27}$$

$$\sqrt{2 \cdot 2 \cdot 5} \qquad\qquad \sqrt{7 \cdot 7 \cdot 2} \qquad\qquad \sqrt{3 \cdot 3 \cdot 3}$$
$$2\sqrt{5} \qquad\qquad 7\sqrt{2} \qquad\qquad 3\sqrt{3}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x-7)^2}{2} - 9 \;=\; -1$$

First, add 9 to both sides.
$$\frac{(x-7)^2}{2} = 8$$

Then, multiply both sides by 2.
$$(x-7)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 7 = \pm 4$$

Add 7 to both sides.
$$x = 7 \pm 4$$

So the two solutions are $x = 11$ and $x = 3$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 8x = -7$$

$$x^2 - 8x + 16 = -7 + 16$$
$$x^2 - 8x + 16 = 9$$
$$(x - 4)^2 = 9$$
$$x - 4 = \pm 3$$
$$x = 4 \pm 3$$
$$x = 7 \qquad \text{or} \qquad x = 1$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 - 30x + 81$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 - 10x) + 81$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 - 10x + 25 - 25) + 81$$

Factor the perfect-square trinomial.

$$y = 3((x - 5)^2 - 25) + 81$$

Distribute the 3.

$$y = 3(x - 5)^2 - 75 + 81$$

Combine the constants to get **vertex form**:

$$y = 3(x - 5)^2 + 6$$

The vertex is at point $(5, 6)$.